

## A new species of *Tarabulida* (Solifugae: Daesiidae) from Kenya, with the first complete description of a male of the genus

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**Abstract.** We describe a new species of *Tarabulida* Roewer 1933 from Kenya. This genus was previously known from only two species (*Tarabulida ephippiata* Roewer 1933 and *Tarabulida fumigata* Roewer 1933) from Libya, which were described from specimens reported as females. *Tarabulida mugambii* new species is based on specimens collected in northwestern Kenya, representing the first complete description of a male *Tarabulida* and the first record for the genus from Kenya. We also discuss problems associated with characterizing *Tarabulida* and its placement within the Daesiidae. A lectotype is designated for the type species of *Tarabulida*, *T. ephippiata* Roewer 1933.

**Keywords:** Solifuges, camel spiders, *Blossia*

The diversity of solifuges in Kenya is poorly known; there are only 36 species recorded from this country (Harvey 2003) and seven formally described subspecies. Roewer's monograph (1932–34) provides the only comprehensive insight into solifuges of Africa and while the revisions by Lawrence (1955, 1960, 1962, 1963, 1968, 1972) are excellent, they mainly focus on the solifuges of southern Africa. Roewer provided continuous updates to his monographic treatment through 1961 with several of these works including solifuges from northern and central Africa (Roewer 1941, 1951, 1952a, 1952b, 1954, 1961). Subsequent to Roewer, very limited work has been completed on solifuges from northern and central Africa. This work is not at all comprehensive and generally focuses on a limited number of species (Panouse 1955, 1957, 1960a, 1960b, 1964; Kraus 1959; Junqua 1962, 1963, 1966; Levy & Shulov 1964; Panouse et al. 1967; Della Cave & Simonetta 1971; Thaler 1982; Gromov 1998, 2000).

This paper focuses on the small and little known genus *Tarabulida* Roewer 1933 in the family Daesiidae. Roewer (1933) described *Tarabulida* from three female specimens, representing two species. Roewer (1933) placed *Tarabulida* in his newly created subfamily Gnosippinae, the latter defined by the 1-1-1-1 tarsal formula shared by *Tarabulida* and the four other originally included genera. The type species of *Tarabulida*, *T. ephippiata* Roewer 1933, was described from Tripoli in Libya. The second species, *T. fumigata* Roewer 1933, was described from Cyrenaica, a large region in eastern Libya bordering Egypt. Males of these species are unknown, but Maury (1980) partially described the flagellum of a "*Tarabulida* sp." while making comparisons between several Old World daesiids and two South American species that he included as the first New World members of the Daesiidae. Although Maury (1980) did not indicate the provenance of this specimen, or who made the determination, he acknowledged curators at the American Museum of Natural History (AMNH) and the Museum of Comparative Zoology (MCZ) for providing specimens for comparison. We describe a new

species of *Tarabulida* from Kenya based on an adult male specimen, an adult female specimen and several immatures, provide comparisons with previously described species, and comment on the placement of *Tarabulida* within Daesiidae.

### METHODS

The terminology for leg spination formulae and pedipalp spination follows Roewer (1933). The term 'ctenidia' is also used as in Roewer (1933). Dentition descriptions largely follow Roewer (1933); however, we utilize a more detailed description of teeth in line with Pocock (1895). The terms 'median' and 'lateral fondal,' or cheek teeth follows Muma (1951) and Wharton (1981). Images were acquired digitally using Syncroscopy's Auto-Montage Pro 5.01.0005 (Copyright Synoptics Ltd.) and PictureFrame (TM) Application 2.3, in combination with a ProgRes 3008 digital camera mounted on a Leica MZ APO dissecting microscope.

The specimens of *Tarabulida* described below were examined as part of a larger survey targeting the diversity and distribution of solifuges in Kenya. The holotype and three immature specimens were collected from Lokichoggio Township, located approximately 30 km from the Sudan border in northwestern Kenya. They were collected from under rocks in shallow depressions in a dry riverbed and at the base of the Mogilla Range, (04.210180°N, 34.375030°E), a fault accumulation made up predominantly of trachyte, rhyolite and associated tuffs (Champion 1937). A female specimen collected a little further east at 'Lake Rudolf' (= Lake Turkana) was discovered amongst unsorted material in the National Museums of Kenya (NMK). The holotype and paratypes of the newly described species from Kenya were stored in 80% ethanol and will be deposited in NMK. The left chelicera of the holotype was used for DNA analysis as part of a larger study. Additional material examined included the syntypes of *T. ephippiata* and holotype of *T. fumigata* (all three specimens from Senckenberg Forschungsinstitut und Naturmuseum) and a male and female specimen from the American

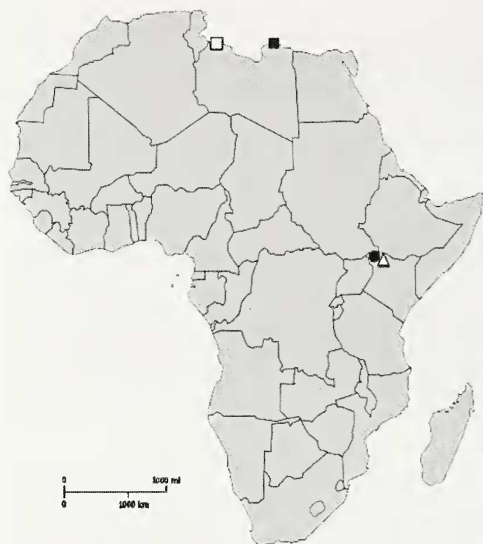


Figure 1.—Distribution of the genus *Tarabulida* in Africa. White square, *T. ephippiata* type locality. Black square, *T. fumigata* probable type locality. Black circle, *T. mugambii* locality for holotype and immature paratypes. White triangle, *T. mugambii* female paratype locality.

Museum of Natural History, New York (AMNH) determined as *Tarabulida* by Bruno Lamoral. Localities of *T. ephippiata* and *T. fumigata* depicted in Fig. 1 were taken from Roewer (1933).

#### TAXONOMY

Family Daesiidae Kraepelin 1899

Genus *Tarabulida* Roewer 1933

**Type species.**—*Tarabulida ephippiata* Roewer 1933 by original designation.

**Remarks.**—*Tarabulida* was described by Roewer on the basis of two species represented by three specimens that shared the following characters: 1.2.2.2 chaetotaxy on tarsi of legs II and III, 2.2.2.2 chaetotaxy on tarsi of leg IV and 5 dorsal spines on the metatarsus of legs II and III. Problems associated with this characterization are treated in the discussion section following the description of *Tarabulida mugambii*.

#### *Tarabulida mugambii* new species

(Figs. 2–9)

**Material Examined.**—Holotype adult male: KENYA: *Rift Valley Province*: Lokichoggio, base of Mogilla Range, 04.210180°N, 34.375030°E, 18 March 2007, Reddick, Wharton and Mugambi (NMK). Paratypes: KENYA: *Rift Valley Province*: 1 adult female, Op. Drake Station, Lake Rudolf, 03.53333°N, 36.2°E, 8 August 1980 (NMK); 1 immature, Lokichoggio, base of Mogilla Range, 04.210220°N, 34.376780°E, 18 March 2007, Reddick, Wharton and Mu-

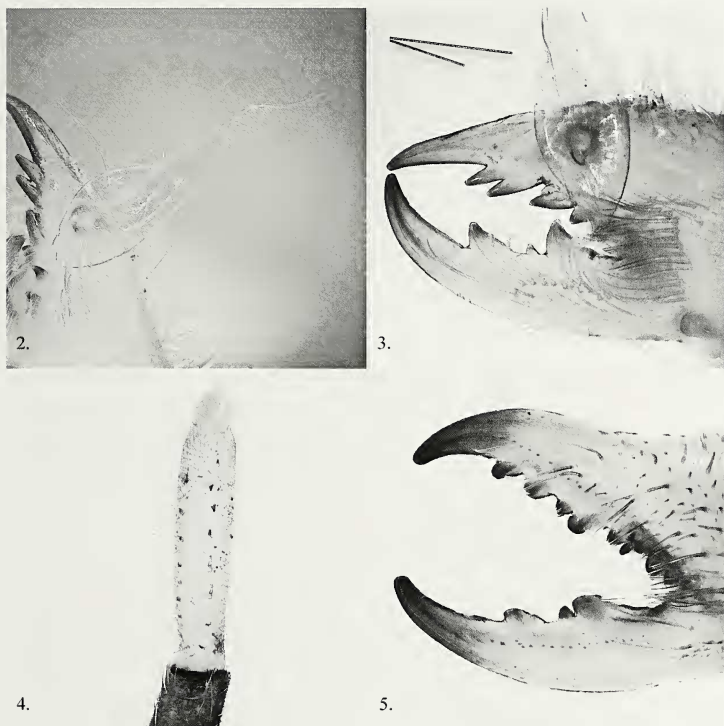
gambi (NMK); 1 immature, same locality, 04.210330°N, 34.375510°E, 16 March 2007, Reddick, Wharton and Mugambi (NMK); 1 immature, Lokichoggio, NW of town, near military barricade, 04.213020°N, 34.350620°E, 17 March 2007, Reddick, Wharton and Mugambi (NMK).

**Etymology.**—This species is named after Mr. Joseph Mugambi, a lead research assistant from the National Museums of Kenya.

**Diagnosis.**—*Tarabulida mugambii* is most readily differentiated from the two previously described species of *Tarabulida* by the presence of spines and cylindrical bristles on the pedipalps. In the other two species, the pedipalps lack spines and cylindrical bristles. The coloration of *T. mugambii* also differs greatly from the two other described species of *Tarabulida*, though this is based primarily on the original descriptions since the syntypes of *T. ephippiata* and holotype of *T. fumigata* (Fig. 10) are badly faded for the most part. From the original description, the opisthosoma of *T. ephippiata* has black pleura separated by a broad band of yellow tergites, with tergites 8–10 also black. The opisthosoma of *T. mugambii* is uniformly medium brown, including tergites, sternites, and pleura; *T. mugambii* is thus somewhat darker than the similarly uniformly colored *T. fumigata*. The malleoli of *T. ephippiata* are edged with black, whereas *T. mugambii* and *T. fumigata* have completely white malleoli. The chelicerae and propeltidium are entirely black in *T. fumigata* but light golden-brown in *T. mugambii* and darker brown in *T. ephippiata*. *Tarabulida mugambii* lacks the black bands associated with legs III and IV of *T. fumigata*, and has a different color pattern on the pedipalps than in the other two species: broadly dark medially, pale basally and apically vs. multiple bands of dark and pale in the previously described species. Of less importance, all three species bear dorsal spines on the metatarsus of Legs II and III; however, in *T. ephippiata* and *T. fumigata*, these spines are much thicker and shorter than in *T. mugambii*. The opisthosomal pleura are also evenly, densely setose in *T. ephippiata*, while in *T. fumigata* and *T. mugambii* the pleura are more sparsely setose.

**Description.**—**Adult male:** Coloration (based on ethanol-preserved specimens): Legs, propeltidium, and chelicerae entirely light golden-brown. All joints on all legs slightly darkening to purple-brown near each articulation. Anterior margin of propeltidium outlined with very thin dark brown line extending posteriorly to delineate exterior lobe of prosoma from rest of propeltidium. Femur and tibia of pedipalps light brown but slightly darker, almost purple-brown, towards distal end of tibia. Coxa, trochanter, metatarsus, and tarsus of pedipalp entirely white. Opisthosoma entirely medium brown (darker than golden-brown of legs) with wide terga (Fig. 8) the same color. Arcus posterior, meso- and metapeltidium medium brown with integument between same color as legs. Malleoli entirely white. Alcohol-preserved material somewhat leached relative to living specimens with legs, propeltidium, and chelicerae more reddish and purple-brown areas darker, with a richer color.

**Flagellum:** Paraxially moveable, membranous, broad basally, gradually tapering distally, margins slightly in-curved at base (Fig. 2). Ventral and dorsal margins of tapered, distal half with projections resembling cilia on leaves of a Venus Fly-Trap plant. Flagellum apically slightly bent and spiraling at



Figures 2–5.—*Tarabulida mugambii* new species: 2. Flagellum; 3. Dentition of male holotype with lines pointing to principal setae; 4. Paired spines on pedipalp of male holotype; 5. Dentition of female paratype.

distal end of in-curved margin (Fig. 2). Apex of flagellum very thin and hair-like with no projections.

Dentition: Moveable finger with two large triangular teeth and a smaller median tooth, situated closer to the proximal large tooth than the distal one (Fig. 3). Four small lateral fonal teeth approximately subequal in size. Two larger median fonal teeth concealed behind mesal surface cheliceral bristles, with the one closest to base of rostrum having a distinct, deep notch. Immoveable finger comprised of three teeth. Two distal teeth long, thin, narrowly triangular, strongly slanted toward apex of chelicerae. Third tooth large, more broadly triangular, with very small triangular dorsal notch, resembling an extra small tooth.

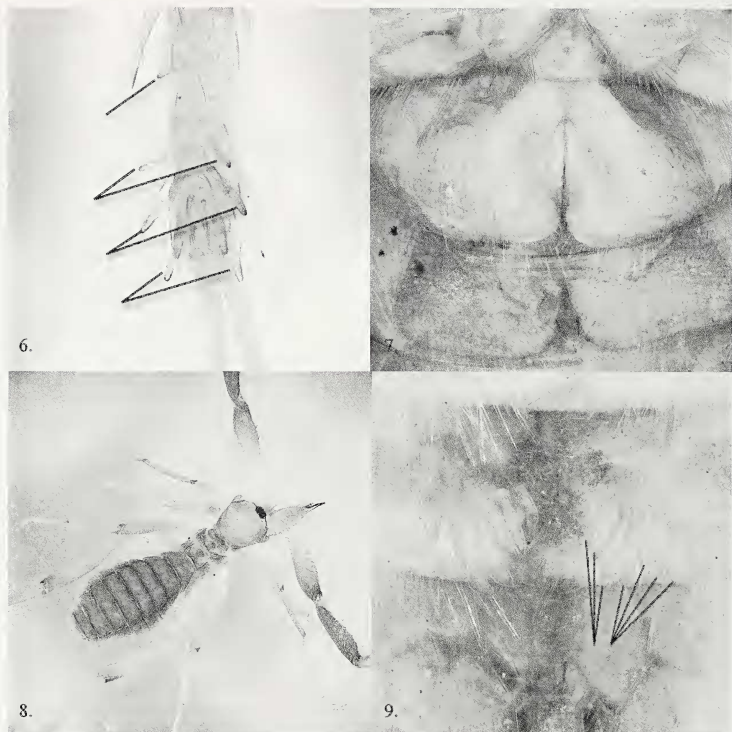
Legs: Leg I with no claws. Legs II–IV with 2 long hairless claws. All legs covered uniformly with short thin hairs. Dorsal surface of metatarsi 2 and 3 with a row of 5 long spines. Tarsal segmentation 1-1-1-1. Tarsi of fourth leg partially divided by weakly indented line, the two divisions not articulated. Ventral spination on tarsi 2 and 3 is 1.2.2.2 (Fig. 6). Ventral spination on tarsi 4 is 2.2.2.2.2.

Chaetotaxy: Chelicerae with many thick spines, ranging in size from very small to long, longer spines forming a line dorso-

medially along chelicerae. Two long, slender, apically directed principal setae present dorsally on immoveable finger, adjacent flagellum (Fig. 2). Propeltidium covered in spines of varying length, most notably, lined with spines along posterior edge, some pointing anteriorly, some posteriorly, giving appearance of a collar. Posterior margins of plagula mediana tergite, mesopeltidium, and metapeltidium also with rows of thick spines. Opisthosoma segments II–VII with dorso-lateral clusters of spines, spines gradually decreasing in thickness posteriorly. Pleura sparsely setose. Ventral surface of both femur and tibia of pedipalp lined with long spines interspersed with shorter cylindrical bristles, arranged primarily in two distinct rows. Metatarsus of pedipalp with six pairs of shorter, evenly spaced spines of equal length (Fig. 4). Body otherwise sparsely setose throughout.

Ctenidia: First postgenital sternite with a group of seven long, broad, pointed ctenidia on each side of midline (Fig. 9), golden brown in color.

*Adult female*: Coloration (based on ethanol-preserved specimen): as in male except coloration of the tergites lighter due to leaching in alcohol. Legs of female not darkening to the same degree as male on leg joints, but there is evidence of some darkening.



Figures 6-9.—*Tarbulida mugambii* new species: 6. Leg III tarsal spines showing the 1.2.2.2 pattern indicative of *Tarbulida* spp.; 7. Genital plate of female paratype; 8. Dorsal habitus of male holotype; 9. Ctenidia on male holotype with lines pointing to ctenidia on right side.

**Dentition:** Moveable finger with two large well-worn teeth with a smaller median tooth, situated closer to the proximal tooth than the distal one (Fig. 5); median tooth much closer to proximal tooth than in male (Fig. 3). Cheek teeth as in male. Cheliceral bristles as in the male but much thicker and more numerous. Immoveable finger with four medium-sized teeth, the most proximal 2 very close together to give the impression of being almost joined. Teeth of female more rounded than in male and not pointing distally as in male. Dorsal surface of immoveable finger with small elevation proximal to fang tip, that gives the impression of a dent or pit on the dorsal surface of the chelicera.

**Legs:** as in male, however dorsal spines on legs II and III thicker than on male.

**Chaetotaxy:** As in male, except female lacks the two long, slender, apically directed principal setae present dorsally on immoveable finger of chelicerae (Fig. 5).

**Ctenidia:** No fully formed ctenidia; however, there are slightly thickened hairs on the post-genital plate.

**Genital sternite:** Modified, clearly bilobed with deep median indentation and posterior margin free (Fig. 7).

**Immatures:** Coloration (based on ethanol-preserved specimens): as in male in two larger immatures, however the smallest immature is almost devoid of color.

**Dentition:** Dentition of immatures similar to male, except notched cheek tooth of holotype represented as two separate teeth in immatures. Thus, immatures with three separate median fang teeth and four separate teeth on immoveable finger. Distal teeth on immoveable finger of immatures vertical, not slanted distally.

**Legs:** As in male, but thicker and shorter in the largest specimen relative to the two smaller specimens; dorsal spines poorly developed or nonexistent in smaller immatures. Smallest specimen with 3 claws on Legs II-IV indicating a very early instar.

**Chaetotaxy:** As in male, including pedipalp spination, however all spines present on immatures much weaker than in adults. Immatures lack the principal setae on the immoveable finger of chelicerae.

**Ctenidia:** No ctenidia present on immatures.

**Dimensions:** Male holotype: Total body length including chelicerae, 16 mm; length of chelicerae, 3 mm; length of leg IV,

20 mm; length of pedipalp, 15.5 mm. Female paratype: Total body length including chelicerae, 21 mm; length of chelicerae, 4.5 mm; length of leg IV, 16.5 mm; length of pedipalp, 14 mm. Immature paratype 1: Total body length including chelicerae, 5 mm; length of chelicerae, 1 mm; length of leg IV, 4.5 mm; length of pedipalp, 3.5 mm. Immature paratype 2: Total body length including chelicerae, 10 mm; length of chelicerae, 2 mm; length of leg IV, 8 mm; length of pedipalp, 7 mm. Immature paratype 3: Total body length including chelicerae, 10 mm; length of chelicerae, 3 mm; length of leg IV, 14 mm; length of pedipalp, 10 mm.

**Distribution.**—The distribution of the genus *Tarabulida* is shown in Fig. 1. The square icons indicate the type localities for *T. ephippiata* and *T. fumigata*. Libya: Tripoli Province, Tripoli (formerly *Tarabulus*) (*T. ephippiata*); Cyrene (formerly Kyrenaika) (*T. fumigata*). The triangular icon indicates the type locality for *T. mugambii*. Although the data label for *T. fumigata* indicates only Kyrenaika, a very large region bordering Egypt in present-day Libya, the specimen is likely to have been collected in the coastal area of this region since the place name 'Kyrenaika' is also known as Cyrenaica or the city of Cyrene in what is now Shabhat, Libya. Also, at the time of Roewer's original descriptions travel into the interior of Libya would have been less likely, as road infrastructure would have been restricted to the coast.

The distribution gap between *T. mugambii* and the two previously described species is considerable (Fig. 1), but the geographic isolation of *T. mugambii* from the other species in the genus can be readily explained by the virtual absence of collected and described species from intermediate areas (Harvey 2003). We therefore predict a more or less continuous distribution for *Tarabulida* for this area wherever suitable habitats exist. The inadequate and patchy collection history has been used to explain large gaps in distribution and low diversity in other areas of Africa as well (Lamoral 1973).

**Ecology.**—We collected the male and immature specimens of *T. mugambii* from under rocks during the day, which indicates nocturnal activity. The habitat was extremely hot and dry but subject to periodic flooding from the nearby seasonally dry river bed, and solifuges were found in shallow depressions under rocks along the base of a large hill. The hills and river bed were sparsely populated with small bushes and various xeric plants. The vegetation of the area where they were collected is categorized as Somalia-Masai desert grassland and shrubland (White 1983), with a rainfall of 100–200 mm per year.

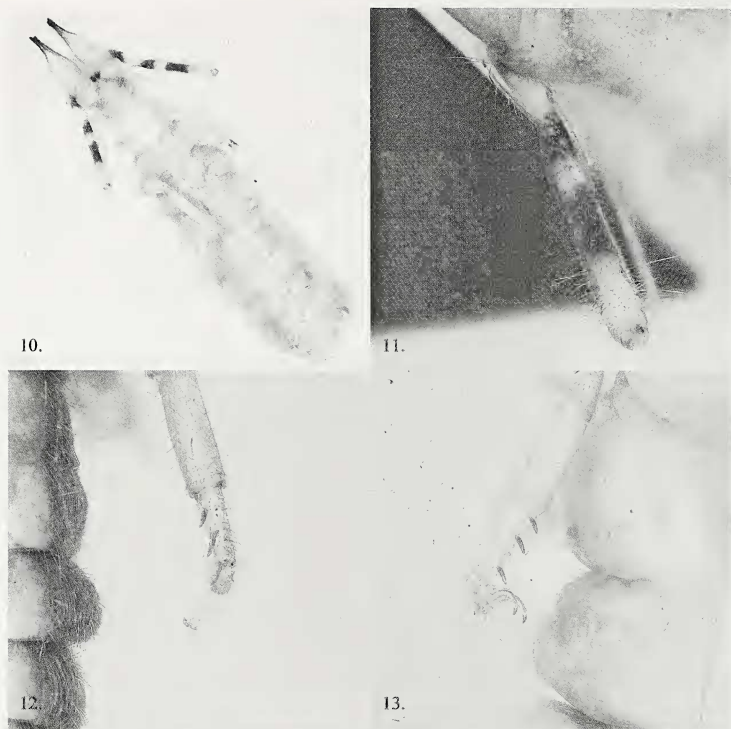
## DISCUSSION

*Tarabulida mugambii* is unquestionably a member of the family Daesiidae, based on the absence of claws on leg I, the presence of a paraxially moveable, malleable, membranous flagellum, and the 1-1-1-1 tarsal formula. Within the Daesiidae, the male holotype and associated paratypes fit the description of Gnosippinae and *Tarabulida* put forth by Roewer (1933) based on the 1-1-1-1 tarsal formula and the 1.2.2.2 tarsal spination on legs II and III (Fig. 6). This particular arrangement of tarsal spines is very different from all other genera in the subfamily Gnosippinae and thus, within the context of Roewer's classification, the specimens described here clearly belong in *Tarabulida*. Roewer's (1933) classifica-

tion of Daesiidae, and for that matter, all of the Solifugae, which relies almost exclusively on tarsal formulae and chaetotaxy, has been severely criticized (Lawrence 1955, 1963; Simonetta & Delle Cave 1968; Della Cave & Simonetta 1971; Wharton 1981). We therefore provide an extended discussion of our rationale for including this new species in *Tarabulida* along with an associated commentary on the larger issue of the generic classification of daesiids.

In direct contrast with *T. mugambii*, the two specimens on which Roewer (1933) based his description of *Tarabulida* lack both ctenidia on the postgenital sternites and thickened spines on the pedipalps (Fig. 11). The presence or absence of ctenidia and the pattern of spination on the pedipalps are useful for discriminating among species in other daesiid genera, such as *Blossia* Simon 1880 and *Hemiblossia* Kraepelin 1899 (Wharton 1981), but the ctenidia in particular may also vary intraspecifically associated with age-related development and/or sexual dimorphism (Wharton 1981; Brookhart & Cushing 2005). In *T. mugambii*, ctenidia are distinctly broadened, fleshy structures in the adult male, but absent in all of the immatures, representing three size classes. The adult female has slightly thickened hairs on the post-genital sternite, not obviously different from those on the more poorly preserved specimens of *T. fumigata* and *T. ephippiata*. The absence of ctenidia in *T. fumigata* and *T. ephippiata*, known only from females (Roewer 1933) and an immature (our assessment of type material), is thus of little assistance either in discriminating among these three species or in clarifying their generic affinities. Similarly, pedipalp spination has been reported to vary intraspecifically in daesiids, as exemplified by sexual dimorphism in *Gnosippus khnzingeri* Karsch 1880 recorded by Roewer (1933), though this requires verification. More commonly, however, variation in pedipalp spination pattern is a useful diagnostic tool for separating species among the Daesiidae. *Hemiblossia brunnea* Lawrence 1953, for example, has a bottle brush-like pattern of spines and setae around the entire circumference of the pedipalp metatarsus and tarsus, whereas *H. australis* Purcell 1902 possesses only paired spines on the ventral sides of the pedipalps from the tarsi to the tibia (Roewer 1933). Wharton (1981) provided similar examples for *Blossia*. In *T. mugambii*, the pedipalp spination pattern of the adult male holotype and the adult female is also found in all immature specimens, suggesting that it will be a useful diagnostic character for this species relative to *T. fumigata* and *T. ephippiata*. As with the ctenidia, however, the value of pedipalp spination pattern for generic-level diagnoses remains dubious and thus sheds no light on the placement of *mugambii* within the Daesiidae.

Placement of our newly described species in *Tarabulida* is a necessary outcome of its inclusion in Roewer's Gnosippinae based on the 1-1-1-1 tarsal formula. Yet Roewer's subfamily classification for Daesiidae has been justifiably criticized because it was established solely on differences in numbers of tarsal segments on legs II, III, and IV (Roewer 1933). Hewitt (1919), Della Cave & Simonetta (1971), Lawrence (1972), and Wharton (1981), working primarily with different species, have all documented variation in tarsal segmentation between the left and right legs of various individuals, noting that this phenomenon is sufficiently commonplace to render proposed classifications ineffectual. Thus, at least some genera, such as *Broomiella* Pocock 1902, have been based on

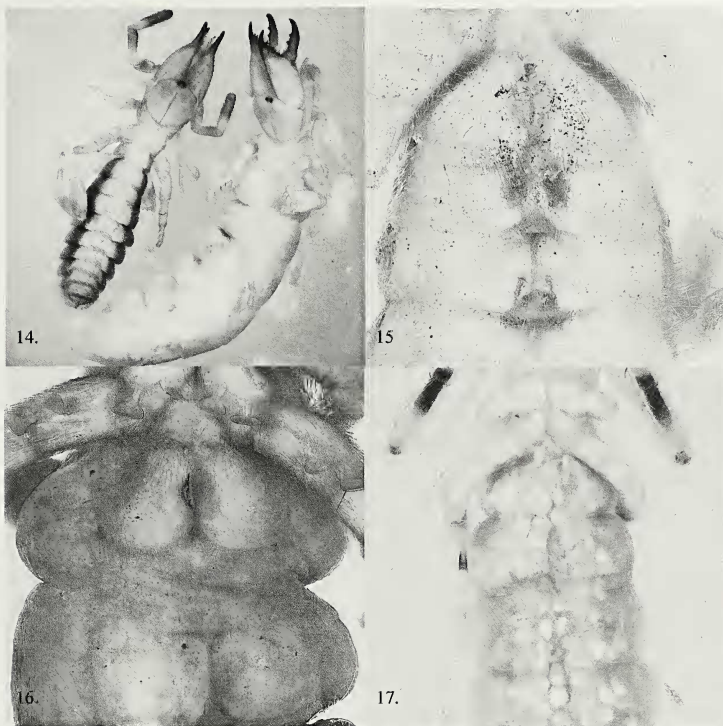


Figures 10-13.—*Tarabulida* type specimens: 10. Dorsal habitus, *T. fumigata* holotype; 11. Pedipalp setation, *T. fumigata* holotype; 12. Dorsal spines of metatarsus leg III, *T. ephippiata* lectotype; 13. Dorsal spines of metatarsus leg III, *T. ephippiata* paralectotype.

individuals with tarsal anomalies (Hewitt 1919; Lawrence 1972), while similar anomalies have led to the assignment of apparently related species to different genera in different subfamilies (see especially Della Cave & Simonetta 1971). With this in mind, it is useful to consider genera outside Roewer's Gnosippinae for the placement of *mugambii*, and *Blossia* is a logical choice. Roewer (1933) used the pattern of ventral spines on the tarsi to define genera within each subfamily and described identical patterns for *Tarabulida* of the Gnosippinae and *Blossiola* Roewer 1933 of the Blossiinae. Wharton (1981) treated *Blossiola* as a synonym of *Blossia*.

In *T. mugambii*, the shape of the flagellum and ctenidia, the presence of principal setae, and the pattern of the cheliceral dentition in the holotype are all consistent with a placement in *Blossia*. The flagellum, though distinctive (Figs. 2, 3), nevertheless shares basic structural similarities with those of species such as *Blossia setifera* Pocock 1900 and *Blossia massaica* Roewer 1933. Unfortunately, these flagellar, ctenidial, setal, and dentition characteristics are all male-specific, and Roewer (1933) did not have any males when he described *Tarabulida*. Thus, the only obvious difference between *Tarabulida* and *Blossia*, based on Roewer (1933), is the number of tarsal

segments on leg IV. We have therefore somewhat reluctantly placed the new species in *Tarabulida* because there is only one tarsal segment on leg IV. Even this characterization is unsatisfactory, however, because in the *T. mugambii* holotype and the associated female, leg IV has a weak suture line extending halfway around the tarsus at its midpoint (though there is no evidence of articulation between the two halves). The suture line on the female is admittedly much weaker than that on the male, and the two larger immatures similarly have a partial suture line, though also not as well developed as on the male. The type specimens of *T. fumigata* and *T. ephippiata* have the leg IV tarsus clearly one-segmented with no trace of a partial suture. The only other difference between *Tarabulida* and *Blossia* that can be extracted from Roewer's (1933) descriptions is the number of dorsal spines on the metatarsus of legs II and III (3 in *Blossia*, 5 in *Tarabulida*, according to Roewer 1933). Unfortunately, examination of the type specimens of *T. ephippiata* and *T. fumigata* reveals that the dorsal spination on the metatarsus (Figs. 12, 13) is variable in both species, with 3 dorsal spines on some legs and 5 on others. In both the male and female specimens of *T. mugambii*, there are 3 distinct dorsal spines and occasionally one or two



Figures 14-17.—*Tarabulida* type specimens: 14. Size difference between types of *T. ephippiata*; 15. Genital sternite of *T. ephippiata* lectotype; 16. Genital sternite of *T. ephippiata* paralectotype; 17. Genital sternite of *T. fumigata* holotype.

weaker ones. The spines on our specimens are thus consistent in number and placement with Roewer's type material. Roewer's (1933) description unfortunately does not encompass the variation we observed among the specimens he had before him when he described *Tarabulida*. A further problem is that the spines are difficult to count because Roewer (1933) referred to all of the spines as dorsal, but two of these are more latero-anteriorly displaced. These latter two are sometimes poorly developed and thus not spinose in appearance.

In general appearance, *T. ephippiata*, and especially *T. fumigata*, resemble the species of *Hemiblossia*, while *T. mugambii* more closely resembles many of the species of *Blossia*. This is due to the fact that the appendages, including the pedipalps, are shorter in *T. fumigata* and *T. ephippiata*, with tarsi and metatarsi shorter and deeper relative to the longer, more slender tarsi and metatarsi of *T. mugambii*. Although male solifuges often have longer legs (and therefore longer leg segments) than females, making such comparisons challenging, both males and females of *Hemiblossia* have relatively short legs and pedipalps. The absence of males of *T. ephippiata* and *T. fumigata* precludes a more meaningful assessment based on appendage size. The comparison of *T. fumigata* (Figs. 10, 11) and *T. ephippiata* (Fig. 14) with

*Hemiblossia* is enhanced by the dark color patterns recorded by Roewer (1933) in his original descriptions of these two species, particularly the black pleura of *T. ephippiata* and the black chelicerae and propeltidium of *T. fumigata*. Unfortunately, the larger and more clearly female syntype of *T. ephippiata* is now completely pale, and the second syntype, though retaining the dark pleura and some banding on the appendages, is also badly leached with the prosoma, described as brown in the original description, now dull yellow. The holotype of *T. fumigata* is also badly leached and there is no longer any trace of black on the chelicerae.

The two syntypes of *T. ephippiata* are dissimilar in appearance (Fig. 14) and have structural differences (e.g., genital and postgenital sternites, Figs. 15, 16) that suggest the possibility that these may not be conspecific. Since this is the type species of *Tarabulida*, a lectotype designation therefore seems appropriate and we hereby designate the smaller of the two specimens (specimen on the left in Fig. 14) as the lectotype. The other specimen becomes a paralectotype. Both specimens are apparently adult females, as suggested by the modified genital sternites. Another difference between the two specimens of *T. ephippiata* is the pedipalp spination. The smaller of the two has more densely bristled metatarsi and

tarsi than does the larger. The holotype of *T. fumigata* (Fig. 10), which has the prosoma much more *Hemiblossia*-like, appears to be an immature specimen, with no modifications of the genital sternite and no apparent opening (Fig. 17).

We also examined two specimens from AMNH, collected in Morocco and determined as *Tarabulida* by Bruno Lamoral. There is one male and one female in a single vial, and we suspect the male is the specimen partially described by Maury (1980). The dark body and the spination pattern on legs II and III, both ventrally and dorsally, fit Roewer's description of *Tarabulida*. However, the tarsi of leg IV are clearly divided into two segments, and the flagellum is characteristic of that found in *Ghiviopsis* Kraepelin 1899 (though neither the segmentation nor spination pattern of leg IV match that of *Ghiviopsis*). As with *T. mugambii*, these specimens are similarly difficult to place because the color pattern and relatively short leg segments match *Tarabulida*, the leg segmentation matches *Blossia* and the spination pattern fits both.

We conclude, as have others have (noted above), that Roewer's subfamily classification of Daesiidae gives a misleading impression of relatedness among the genera and hinders correct application of generic names to newly discovered species. A detailed revision of the species groups of *Blossia* and *Hemiblossia*, possibly along the lines suggested by Hewitt (1919) and Wharton (1981), is essential for an improved understanding of the placement of *Tarabulida* within Daesiidae, including assessment of whether or not it can be retained as a valid taxon. However, it will be difficult to undertake a meaningful revision of *Hemiblossia* without a better sampling of correctly associated adult males and females. Similarly, in order to fully characterize *Tarabulida*, it will be essential to collect males of *T. ephippiata*, the type species, and *T. fumigata* since secondary sexual characteristics are important for delineating species groups within Daesiidae. Knowledge of flagellar morphology in particular will assist in assessment of relationships among *Tarabulida*, *Blossia*, and *Hemiblossia* and thus considerably facilitate future placement of species such as *T. mugambii*.

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